



# TES Mitigation and Monitoring Techniques to Increase Dredging Windows and TES Protection

## Dredging Operations Environmental Research (DOER) Program

U.S. ARMY CORPS OF ENGINEERS

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### Focus Area

Dredged Material Management

### Problem

Turtle tickler chains (TTC) are used as the primary sea turtle protection tool during international hopper dredging projects. The DOER program coordinated and leveraged assets with POH, SPN, and NWP to successfully evaluate TTC performance on the hopper dredge ESSAYONS while operating in Hawaii. The main performance metric being evaluated was that the chain array did not entangle during deployment while in the water column or on the sea bottom that would form a drowning hazard for turtles. The TTC performance was observed in great detail in videos produced by a high-resolution acoustic camera installed on the ESSAYONS' dragarm (turbidity degraded quality of the other deployed conventional underwater cameras). This research task builds on the results of that previous effort. Adoption of TTC by the regulatory agencies requires that the effectiveness of TTC for moving turtles away from the path of a draghead be proven before it is accepted to be used to prevent/reduce entrainments. This will require evaluation and documentation of the behavioral responses of sea turtles to a TTC array or similar physical stimuli. Close coordination between participants will be required to try to minimize NMFS ultimately requiring both TTC and the draghead turtle deflectors instead of using TTC in lieu of draghead turtle deflectors. There is also currently a lack of understanding of the spatial and temporal occurrence of sea turtles within the dredging projects. Expensive investigations with (tagged) sea turtle tracking have been conducted for collecting limited spatially and temporally-based occurrence data. This dearth of data and information is, in large part, due to the absence of a near-real time survey system that is capable of detecting and discriminating different types of turtles on much-larger spatial scales less expensively.



### Study Description

Full-scale implementation strategies must be developed and extensive coordination among USACE, National Marine Fisheries Service (NMFS), dredging contractors project delivery team members, and other stakeholders must be done to facilitate opportunities to allow the use of TTC so that its effectiveness in moving turtles away from the drag head can be evaluated and documented to facilitate the use of TTC instead of draghead turtle deflectors. Acoustic-based camera systems are being investigated to evaluate TTC performance and are also being applied in the development of a turtle survey system capable of quickly detecting and discriminating different types of turtles on a larger spatial scale in navigation channels than the existing limited and expensive tagged turtle approach.

### Products

TTC hard deliverables will include an engineering design of TTC and dredging contract technical specifications for implementing them into dredging project contracts. Technical reports and journal manuscripts will document TTC performance metrics in reducing turtle takes and provide guidance in their use. The incorporation of TTC in lieu of draghead turtle deflectors in Biological Opinions is the highest priority hard deliverable. A more efficient and less expensive turtle survey system capable of collecting spatially and temporally-based turtle occurrence data in navigation channels will be developed and technical reports and journal manuscripts documenting its development, system performance metrics, and guidance in its use will be produced.

### Summary

The objectives of this research task will be to coordinate with USACE divisions and districts and regulatory agencies to; 1) improve engineering controls (TTC) to reduce turtle takes and 2) develop a more efficient and less expensive turtle survey system to collect spatially and temporally-based occurrence data for making scientifically-defensible risk mitigation decisions. A specific goal of this RT is for *TTC to be used during U.S hopper dredging projects in lieu of currently-used turtle deflectors*. A turtle survey system capable of more quickly characterizing a larger turtle type and population distribution in specific navigation channels will improve decision making in a wide range of aspects including negotiation of specific terms of Biological Opinions and USACE dredging project management risk mitigation determinations.



*Balancing operational and environmental initiatives and meeting complex challenges of dredging and dredged material placement in support of the navigation mission.*

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